

REMARKS

By this Amendment, claims 2-5, 9, and 12-14 are amended. Accordingly, claims 2-5, 9, and 12-14 are pending in this application and claims 6-8 are withdrawn. Favorable reconsideration is respectfully requested based upon the amendments to the claims and the remarks below.

In the instant Office Action, the Patent and Trademark Office (PTO) rejects claim 14 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Specifically, the PTO asserts that claim 14 comprises structural limitations which cannot be in a structureless composition, i.e., a slurry composition. Claim 14 is amended to recite wherein the composition is to a ceramic green sheet. Because a ceramic green sheet comprises a structure that may be "laminated to form a several tens of layer thick stack," withdrawal of the rejection under 35 U.S.C. §112 is respectfully requested.

The PTO further rejects claims 2-5, 9, and 14 under 35 U.S.C. §103(a), as obvious over U.S. Patent No. 4,379,109 to Simpson. In addition, dependent claims 12 and 13 are rejected under 35 U.S.C. §103(a) over Simpson in view of U.S. Patent No. 5,268,415 to Pieterse et al. ("Pieterse").

To establish a prima facie case of obviousness under 35 U.S.C. §103(a), there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. This rejection is respectfully traversed.

In view of the Examiner's comments in paragraph 6 of the Office Action, independent claim 2 is amended to recite a product by process claim, wherein a ceramic green sheet is formed by:

"extruding a slurry composition comprising 20 wt% - 50 wt% of a ceramic powder, 2 wt% - 10 wt% of a polymer having an average molecular weight of 400,000 or more, 0.1 wt% - 2 wt% of a polymer having hydrogen bond-forming functional groups, and 40 wt% - 75 wt% of a solvent, and 1 wt% - 5 wt% of a polymer having an average molecular weight of 400,000 or less, wherein the ceramic green sheet has a thickness of about 10µm or less."

(Emphasis added).

With respect to claims 2-5, the PTO maintains its rejection of claims 2-5 as set forth in the Office Action mailed July 24, 2006. Applicant respectfully disagrees and submits that nowhere does Simpson disclose, teach, or suggest the slurry composition or the thickness of the extruded green sheet, as recited in claim 2.

In the Office Action of July 26, 2006, the PTO acknowledges that Simpson fails to disclose specific amounts of a composition in the explicit amounts recited in claim 2 and asserts that the amount of lower molecular weight polyethylene is a result effective variable and it would be obvious to one of ordinary skill in the art to utilize an amount of polyethylene, as recited in claim 2. Applicant respectfully disagrees.

Green sheets for use in electronic devices are known to be fabricated by alternately laminating ceramic green sheets and internal electrodes, and pressing and sintering the laminated structure. The green sheet is produced using ultra-high molecular weight polymer, and a problem exists of a poor interlayer adhesive strength when laminated and pressed, thus causing cracks and delamination. Furthermore, if the cracks between layers occur due to its poor interlayer adhesive strength, it cannot be utilized in the fabrication of 30 layers or more chip components. The lamination of green sheets into 40 or more layers for fabricating high performance electronic devices causes a problem of pillowing.

In order to solve the above problems, claim 2 recites an optimized slurry composition for the green sheet for electronic devices that can be laminated to form a stack, several tens of layers thick, by increasing the interlayer adhesive strength between the green and the internal electrodes. Specifically, the Applicant's green sheet comprises a polymer having hydrogen bond-forming functional groups so as to increase green sheet strength.

Further, the green sheet, as recited in claim 2, should contain a polymer having a weight-average molecular of 400,000 or more and a polymer having a weight-average molecular of 400,000 or less. By combining the ultrahigh molecular weight polymer and the relative low molecular weight polymer in the present invention, the repulsive force between an electrode layer and green sheets can be reduced, so that the lamination of the layers can be facilitated.

The PTO asserts that that Simpson not only discloses the green sheet composition overlapped with that of the Applicant's, but also the combination of the ultrahigh molecular weight polymer and the relative low molecular weight polymer, as recited in claim 2. Applicant respectfully disagrees.

Simpson only appears to describe a method of making ceramic monolithic structure having a plurality of flow channels, and the use of such structure as a high temperature filter and heat exchanger. Nowhere does Simpson disclose, teach or suggest manufacturing the green sheet for use in electronic devices, as recited in claim 2.

Further, claim 2 recites wherein the ultrahigh molecular weight polymer is added to the relative low molecular weight polymer, so as to increase the interlayer adhesive strength between the green sheet and the internal electrodes, and to facilitate the lamination of the layers. Simpson fails to disclose this feature.

Again, Applicant respectfully submits that Simpson only appears, in the detailed description (column 3, lines 10-16), to disclose the combination of polymers so as to avoid consequent brittleness of the green sheet. Nowhere does Simpson specifically teach or suggest the technical feature of adding an ultrahigh molecular weight polymer and a relatively low molecular weight polymer, as described by the Applicant.

Based upon the above, Applicant respectfully submit that Applicant's ceramic green sheet, as recited in claim 2, is differentiated from Simpson's method of preparing a monolithic structure. Nowhere does Simpson evidence disclosure or motivation, implicit or explicit, to suggest a ceramic green sheet, adapted for use in an electronic device, produced by extruding a slurry compound as described in claim 2, and wherein the ceramic green sheet has a thickness of about 10 μm or less.

Applicant respectfully submits, therefore, that independent claim 2 is patentable over Simpson. Applicant respectfully submits that claims 3-5, 9, and 14 are likewise patentable over Simpson at least for their dependence on an allowable base claim, as well as for additional features it/they recite. Withdrawal of the rejection over Simpson is respectfully requested.

The PTO further rejects claims 12-13 under 35 U.S.C. §103(a) over Simpson in view of U.S. Patent No. 5,268,415 to Pieterse et al. ("Pieterse"). This rejection is respectfully traversed.

Claims 12 and 13 depend from claim 2 and notwithstanding any teachings of Pieterse, in regards to the use of various solvents, Applicant respectfully submits that Pieterse similarly fails to disclose a ceramic green sheet, adapted for use in an electronic device, produced by extruding a slurry composition comprising a polymer having a weight-average molecular of 400,000 or more and a polymer having a weight-average molecular of 400,000 or less, and having a thickness of about 10 μ m or less, as recited in claim 2.

Therefore, claims 12 and 13 are likewise patentable over the applied art for at least their dependence on an allowable base claim, as well as for the additional features they recite. Accordingly, withdrawal of the rejection of claims 12 and 13 over Simpson and Pieterse is respectfully requested.

All rejections have been addressed. In view of the foregoing, Applicant respectfully submits that the application is in condition for allowance and favorable reconsideration and prompt allowance of claim 2-5, 9, and 12-14 is earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

LOWE HAUPTMAN & BERNER, LLP



Benjamin Hauptman
Registration No. 29,310

1700 Diagonal Road, Suite 300
Alexandria, Virginia 22314
(703) 684-1111
(703) 518-5499 Facsimile
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BJH/ERM/ayw